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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/075,972	02/14/2002	Terry L. Fruehling	60,408-126	9274

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DELPHI TECHNOLOGIES, INC.
M/C 480-410-202
PO BOX 5052
TROY, MI 48007

EXAMINER

DUNCAN, MARC M

ART UNIT PAPER NUMBER

2113

DATE MAILED: 09/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/075,972

Applicant(s)

FRUEHLING ET AL.

Examiner

Marc M Duncan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 February 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-58 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 9-14, 16-28, 32-39 and 41-58 is/are rejected.
- 7) ☒ Claim(s) 6-8, 15, 29-31 and 40 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

Status of the Claims

Claims 35-38, 46-49 and 52-56 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1, 2, 3, 4, 9, 10, 11, 12, 13, 18, 19, 20, 21, 22, 24, 25, 26, 27, 32, 33, 34, 37, 38, 43, 44, 45, 50, 51 and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fennel et al. in view of Heugel et al.

Claims 5, 14, 28 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fennel et al. in view of Heugel et al.

Claims 16, 17, 41 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fennel and Heugel as applied to claims 11 and 34 above, and further in view of Dutton et al.

Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fennel and Heugel as applied to claim 22 above, and further in view of Discenzo.

Claims 57 and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fennel and Heugel as applied to claim 1 above, and further in view of Poisner.

Claims 6-8, 15, 29-31, 40 and 36-58 are objected to.

Information Disclosure Statement

The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the

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list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Claim Objections

Claims 36-58 are objected to because of the following informalities: there are two claims labeled as 36 and two claims labeled as 37. Consequently, the numbering from the first claim 36 to the end of the claim set is completely unclear. The examiner has attempted to address the claims with their claim number as filed. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 35-38, 46-49 and 52-56 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 35-36, 38, 46-47, 49, 52-53 and 55 recite the limitation "the first system" in line. There is insufficient antecedent basis for this limitation in the claim.

Claims 54-56 recite the limitation "a system, as set forth in claim 51" in line 1. There is insufficient antecedent basis for this limitation in the claim. Claim 51 is a method claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1, 2, 3, 4, 9, 10, 11, 12, 13, 18, 19, 20, 21, 22, 24, 25, 26, 27, 32, 33, 34, 37, 38, 43, 44, 45, 50, 51 and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fennel et al. in view of Heugel et al.

Regarding claim 1:

Fennel teaches a primary processing unit in Fig. 2 and col. 1 lines 55-56.

Fennel teaches a secondary processing unit coupled to the primary processing unit in Fig. 2 and col. 1 lines 49-50.

Fennel teaches wherein the primary and secondary processing units are adapted to run a control algorithm in col. 1 lines 43-53.

Fennel teaches a functional compare module coupled to the primary processing unit and the secondary processing unit for comparing a primary output of the primary processing unit and a secondary output of the secondary processing units after the

control algorithm has been run by the primary and secondary processing units in col. 1 lines 43-53.

Fennel does not explicitly teach a common memory connected to each processing unit. Fennel does, however, teach both processing units running the same control algorithm and processing the same data.

Heugel teaches a common memory connected to each processing unit in col. 1 lines 15-16.

It would have been obvious to one of ordinary skill in the art at the time of invention to combine the shared memory of Heugel with the processing units of Fennel.

One of ordinary skill in the art at the time of invention would have been motivated to combine the teachings because Fennel teaches that both processing units perform the same control algorithm and process the same data. Fennel also expresses a need to minimize the number of components utilized in col. 1 lines 60-61. The shared memory of Heugel meets both needs of Fennel by providing the same data for each processing unit in a single shared memory, thereby reducing the number of necessary components.

Regarding claim 2:

Fennel teaches wherein the functional compare module is adapted to detect a fault if the primary output and the secondary output are not the same in col. 1 lines 43-53.

Regarding claim 3:

Fennel teaches wherein the primary output and the secondary output are data in col. 1 lines 50-53.

Regarding claim 4:

Fennel teaches wherein the primary output and the secondary output are control signals in col. 1 lines 50-53. The processing units of Fennel are control units and therefore necessarily produce control signals as their output data.

Regarding claim 9:

Fennel teaches wherein the primary processing unit is coupled to a system for control of the system, and wherein the secondary processing unit is adapted to control the system if a fault is detected in the primary processing unit in col. 1 lines 56-66 and col. 2 lines 26-29.

Regarding claim 10:

Fennel teaches wherein the secondary processing unit is coupled to a second system for control of the second system in col. 1 lines 64-66 and col. 2 lines 1-4.

Regarding claim 11:

The teachings of Fennel and Heugel are outlined above.

Fennel also teaches reading a control algorithm stored in the common memory by the primary processing unit in col. 2 lines 7-10. Providing data to the control unit for performing the controlling task is equivalent to reading the control program.

Fennel also teaches reading the control algorithm stored in the common memory by the secondary processing unit in col. 2 lines 7-10. Both of the control units receive the data necessary for control.

Regarding claim 12:

Fennel teaches wherein the primary output and the secondary output are data in col. 1 lines 50-53.

Regarding claim 13:

Fennel teaches wherein the primary output and the secondary output are control signals in col. 1 lines 50-53. The processing units of Fennel are control units and therefore necessarily produce control signals as their output data.

Regarding claim 18:

Fennel teaches wherein the primary processing unit is coupled to a system for control of the system, and wherein the secondary processing unit is adapted to control the system if a fault is detected in the primary processing unit in col. 1 lines 56-66 and col. 2 lines 26-29.

Regarding claim 19:

Fennel teaches wherein the secondary processing unit is coupled to a second system for control of the second system in col. 1 lines 64-66 and col. 2 lines 1-4.

Regarding claim 20:

See the teachings of Fennel and Heugel outlined above.

Fennel further teaches that the apparatus controls a first system of a motor vehicle in the Title.

Regarding claim 21:

Fennel teaches the first system being a brake system in the Title. An automobile inherently includes a brake system.

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Regarding claim 22:

Fennel teaches the first system being a steering system in the Title. An automobile inherently includes a steering system.

Regarding claim 24:

Fennel teaches the first system being an engine control system in the Title. An automobile inherently includes an engine control system.

Regarding claim 25:

Fennel teaches wherein the functional compare module is adapted to detect a fault if the primary output and the secondary output are not the same in col. 1 lines 43-53.

Regarding claim 26:

Fennel teaches wherein the primary output and the secondary output are data in col. 1 lines 50-53.

Regarding claim 27:

Fennel teaches wherein the primary output and the secondary output are control signals in col. 1 lines 50-53. The processing units of Fennel are control units and therefore necessarily produce control signals as their output data.

Regarding claim 32:

Fennel teaches wherein the secondary processing unit is adapted to control the system if a fault is detected in the primary processing unit in col. 1 lines 56-66 and col. 2 lines 26-29.

Regarding claim 33:

Fennel teaches wherein the secondary processing unit is coupled to a second system for control of the second system in col. 1 lines 64-66 and col. 2 lines 1-4.

Regarding claim 34:

See the teachings of Fennel and Heugel outlined in the rejections of claims 1 and 11.

Fennel further teaches that the controller is for use in a motor vehicle in the Title.

Regarding claim 37(2):

Fennel teaches wherein the primary output and the secondary output are data in col. 1 lines 50-53.

Regarding claim 38:

Fennel teaches wherein the primary output and the secondary output are control signals in col. 1 lines 50-53. The processing units of Fennel are control units and therefore necessarily produce control signals as their output data.

Regarding claim 43:

Fennel teaches wherein the primary processing unit is coupled to a system for control of the system, and wherein the secondary processing unit is adapted to control the system if a fault is detected in the primary processing unit in col. 1 lines 56-66 and col. 2 lines 26-29.

Regarding claim 44:

Fennel teaches wherein the secondary processing unit is coupled to a second system for control of the second system in col. 1 lines 64-66 and col. 2 lines 1-4.

Regarding claim 45:

Fennel teaches a primary processing unit couple to the motor vehicle and adapted to perform a first set of functions in Fig. 2 and col. 1 lines 55-56.

Fennel teaches a secondary processing unit coupled to the motor vehicle and to the primary processing unit and adapted to perform a primary set of test functions in Fig. 2 and col. 1 lines 49-50.

Fennel teaches wherein the primary processing unit is adapted to run a control algorithm in col. 1 lines 43-53.

Fennel teaches a functional compare module coupled to the primary processing unit and the secondary processing unit for comparing a primary output of the primary processing unit and a secondary output of the secondary processing units after the control algorithm has been run by the primary and secondary processing units in col. 1 lines 43-53.

Fennel teaches that the secondary processing unit is adapted to perform the first set of functions upon detection of a fault in the primary processing unit in col. 2 lines 26-29.

Fennel does not explicitly teach a common memory connected to each processing unit. Fennel does, however, teach both processing units running the same control algorithm and processing the same data.

Heugel teaches a common memory connected to each processing unit in col. 1 lines 15-16.

It would have been obvious to one of ordinary skill in the art at the time of invention to combine the shared memory of Heugel with the processing units of Fennel.

One of ordinary skill in the art at the time of invention would have been motivated to combine the teachings because Fennel teaches that both processing units perform the same control algorithm and process the same data. Fennel also expresses a need to minimize the number of components utilized in col. 1 lines 60-61. The shared memory of Heugel meets both needs of Fennel by providing the same data for each processing unit in a single shared memory, thereby reducing the number of necessary components.

Regarding claim 50:

Fennel teaches wherein the secondary processing unit is adapted to perform a second set of functions, and wherein the primary processing unit is adapted to perform a set of secondary test functions, and wherein the functional compare module is adapted to detect a fault in the secondary processing unit, wherein the primary processing unit is adapted to perform the second set of functions upon detection of a fault in the secondary processing unit in col. 1 lines 56-66, col. 2 lines 26-29 and col. 2 lines 49-50. If the units are performing mutual tests, they also perform mutual takeover in case of faults.

Regarding claim 51:

The claim is rejected as the method of using the apparatus of claim 45.

Regarding claim 56:

Fennel teaches the steps of: performing a second set of functions by the secondary processing unit; performing a set of secondary test functions by the primary processing unit; and, wherein the secondary processing unit is adapted to perform a set

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of secondary test functions, and responsively detecting a fault in the secondary processing unit; and, performing the second set of functions by the primary processing unit upon detection of a fault in the secondary processing unit in col. 1 lines 56-66, col. 2 lines 26-29 and col. 2 lines 49-50. If the units are performing mutual tests, they also perform mutual takeover in case of faults.

Claims 5, 14, 28 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fennel et al. in view of Heugel et al.

Regarding claims 5, 14, 28 and 39:

The teachings of Fennel and Heugel are outlined above.

Fennel and Heugel do not explicitly teach performing diagnostics at startup. Fennel and Heugel do, however, teach performing diagnostics for system reliability and safety concerns.

The examiner takes official notice that performing diagnostics at startup of a controller was well known and widely used by those of ordinary skill in the art at the time of invention.

It would have been obvious to one of ordinary skill in the art at the time of invention to combine startup diagnostics with the diagnostic teachings of Fennel and Heugel.

One of ordinary skill in the art at the time of invention would have been motivated to combine the teachings because performing diagnostics at startup of a controller allows for the functionality of the controller to be determined before any attempt is made

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to use a possibly non-functional or degraded controller. The use of startup diagnostics, therefore, provides added reliability and safety to the system utilizing the controller.

Claims 16, 17, 41 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fennel and Heugel as applied to claims 11 and 34 above, and further in view of Dutton et al.

Regarding claims 16 and 41:

The teachings of Fennel and Heugel are outlined above.

Fennel and Heugel do not explicitly teach generating a signature of signals and comparing the generated signature with a reference signal to detect a fault. Fennel and Heugel do, however, teach comparing the outputs of processing units in order to detect faults.

Dutton teaches generating a signature of signals and comparing the generated signature with a reference signal to detect a fault in the Abstract lines 11-16.

It would have been obvious to one of ordinary skill in the art at the time of invention to combine the signatures of Dutton with the fault detecting of Fennel and Heugel.

One of ordinary skill in the art at the time of invention would have been motivated to combine the teachings because Fennel and Heugel express a need to compare the outputs of processing units to one another to detect a fault. Dutton meets that need with the use of signature generation to compare output signals.

Regarding claims 17 and 42:

Dutton teaches the at least one bus includes an address bus, a data bus and a control bus in Fig. 2. Dutton teaches processors. It is inherent in the structure of a processor to include an address bus, a data bus and a control bus.

Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fennel and Heugel as applied to claim 22 above, and further in view of Discenzo.

Regarding claim 23:

The teachings of Fennel and Heugel are outlined above.

Fennel and Heugel do not explicitly teach the steering system being a steer by wire system. Fennel and Heugel do, however, inherently teach a steering system.

Discenzo teaches a steer by wire system in the Title.

It would have been obvious to one of ordinary skill in the art at the time of invention to combine the steer by wire system of Discenzo with the steering system of Fennel and Heugel.

One of ordinary skill in the art at the time of invention would have been motivated to combine the teachings because the steer by wire system eliminates a number of required mechanical connections and components (Discenzo col. 1 lines 27-29).

Claims 57 and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fennel and Heugel as applied to claim 1 above, and further in view of Poisner.

Regarding claims 57 and 58:

The teachings of Fennel and Heugel are outlined above.

Fennel and Heugel do not explicitly teach determining a signature of stored data values in real time, subsequently retrieving the data and determining a second signature

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of the data values and comparing the signature to detect a memory fault. Fennel and Heugel do, however, teach a common memory as part of the controller, the common memory providing the control algorithms.

Poisner teaches determining a signature of stored data values in real time, subsequently retrieving the data and determining a second signature of the data values and comparing the signature to detect a memory fault in col. 3 line 30-col. 4 line 11.

It would have been obvious to one of ordinary skill in the art at the time of invention to combine the signatures of Poisner with the memory of Fennel and Heugel.

One of ordinary skill in the art at the time of invention would have been motivated to combine the teachings because Poisner teaches that by using such signature testing of memory, it can be determined if data in memory is being corrupted, which thereby increases the reliability of the system and protects data stored in the memory.

Allowable Subject Matter

Claims 6-8, 15, 29-31 and 40 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: Prior art was not found that explicitly teaches or fairly suggests at least one peripheral module coupled to the primary processing unit, wherein the at least one peripheral module includes a built in self test circuit for detecting faults within the peripheral module, the built in self test circuit being coupled to the primary processing unit as outlined in claims 6, 15, 29 and 40. Prior art was not found that explicitly

teaches or fairly suggests the functional compare module generating signatures as outlined in claims 7 and 30.

Conclusion


The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art not relied upon contains elements of the instant claims and/or represents a current state of the art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marc M Duncan whose current telephone number is 703-305-4622. The examiner's phone number after October 15, 2004 will be 571-272-3646. The examiner can normally be reached on M-T and TH-F 6:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Beausoliel can be reached on 703-305-9713. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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